

Before the
Federal Communications Commission
Washington, DC 20554

In the Matter of

FCC Project TRB 02-02, “Measured Emissions
for Use in Evaluating the Ultra-Wideband
(UWB) Emissions Limits in the Frequency
Bands Used by the Global Positioning System
(GPS)

ET Docket 98-153

Comments of Time Domain Corporation

1. OVERVIEW

Time Domain commends the FCC for undertaking this measurement program. The findings validate that:

- Many electrical and electronic devices radiate in the restricted bands at levels that are above those established for UWB devices.
- These emissions, and not thermal noise, establish a limit of performance for many systems in many common environments, especially indoors.
- The FCC UWB limits are extremely conservative.

The Commission’s *First Report and Order* on ultra-wideband established extraordinarily conservative limits on UWB emissions in the 960 to 1610 MHz band. This was because

some believed that such limits were necessary to protect the application of augmented GPS for the location of cellphones within buildings (i.e., cellular E911). However, the Commission's measurements show that ambient noise levels in the GPS L1 band in many buildings currently exceed the levels that NTIA assumed to be required to protect services in the restricted L1 band.¹ For these environments the additive noise power from operation of a realistic deployment of various UWB devices would be insignificant.

The FCC's measurements also support the case that the UWB industry has made regarding the aggregate impact of UWB emissions. The FCC measurements were conducted in common environments indoors and outdoors. In fact, the indoor environments that were measured are found in nearly every office building throughout the modern world. Yet, while the indoor noise-floor was frequently higher than -117 dBm/MHz, the outdoor environment was not. The measurements made by the Commission show that NTIA, in both its submission on selected federal systems² and on GPS³, utilized unrealistic propagation models to evaluate the potential aggregate effect of UWB devices. Time Domain noted in its comments that the NTIA models were highly inaccurate⁴. The FCC's measurements support Time Domain's criticism of the NTIA

¹ NTIA Special Publication 01-45, *Assessment of Compatibility Between Ultrawideband Systems and Global Positioning Systems (GPS) Receivers*, (Feb. 2001).

² NTIA Special Publication 01-43, *Assessment of Compatibility Between Ultrawideband Devices and Selected Federal Systems* (Jan. 2001)

³ NTIA Special Publication 01-45.

⁴ *Comments of Time Domain Corporation, In Response to the Request for Comments on Test Data Submitted by NTIA Regarding Potential Interference to Selected Federal Systems from Ultra-Wideband Transmission Systems*, FCC ET Docket 98-153, February 23, 2001.

methodology. Thus, as we have long maintained, large numbers of UWB devices will not raise the noise-floor over a wide area.

2. ANALYSIS OF FINDINGS

The measurements show that there are already sources of RF noise in the 960 – 1610 MHz band that exceed the limits established for any UWB device that would be authorized for use by other than federal agencies.⁵ At the same time, there is no evidence to show that the existing levels of emissions pose any realistic threat of harmful interference to services in the restricted bands.

Outdoor Measurements

The data show that there are significant ambient noise emissions in the measured bands. These emissions levels appear to have been measured at distances far greater from the source of the emissions than the separation distance used by the various opponents of UWB when performing their interference analyses. On this basis, it is reasonable to conclude that UWB emissions will have virtually no impact on these existing ambient levels, either singularly or in the aggregate. While we cannot extrapolate an impact from these ambient levels on specific systems, the data underscore that it would be unwise to be overly dependent upon GPS for safety-of-life applications, if GPS is as fragile as suggested by the arguments alleging that harmful interference would result absent adherence to emissions levels at or below those adopted for UWB.

⁵ Federal agencies are not directly regulated by the FCC in the use of spectrum, although Time Domain would expect some degree of coordination between the federal government through NTIA and the FCC with respect to federal UWB operations, which serve important defense and public safety applications.

The FCC's measurement of emissions in the L1 band at the Port of Baltimore⁶ shows an emission in the L1 band at approximately 1575 MHz. This emission has a peak amplitude of -117 dBm/MHz. While the document does not explicitly state that there were no emitters within two meters of the measurement antenna, the implication is that there is at least one emitter in that area that emits well above the UWB limit.

The levels clearly show that UWB devices conforming to the limits established in the First Report and Order could have no impact on the noise levels in the bands. The data further suggest that some relaxation of the existing limits on UWB devices would probably not have an impact.

Indoor Measurements

The levels measured indoors are quite striking. The driving premise behind the UWB emissions limits in the 960 to 1610 MHz band was that GPS had to be protected to ensure the potential for indoor applications of GPS. The FCC's data show that in these instances the levels are already in excess of the requirements cited by NTIA.⁷ Thus, the underlying premise behind their arguments is invalid.

While the report does not explicitly state that there were no emitters within 2 meters of the measurement antenna, the implication is that there was at least one device radiating well in excess of the UWB limit in each of the measurement environments. As such, the report calls into question the necessity for maintaining UWB levels at those selected in the First Report and Order. In this regard, the report underscores the

⁶ Figure C-36.

⁷ NTIA Special Publication 01-45, *Assessment of Compatibility Between Ultrawideband Systems and Global Positioning Systems (GPS) Receivers*, (Feb. 2001).

reasonableness of applying less restrictive UWB limits to such critical public safety applications as through-the-wall radar and firefighter tracking systems as sought in the Petition for Reconsideration submitted in the UWB proceeding by Time Domain.

Respectfully,
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November 22, 2002